

CLAIMS

What is claimed is:

1. A method, comprising:

5 directing a laser beam at a mixture of carbon nanotubes disposed in a microfluidic layer in laminar flow, the laser beam having a frequency less than a resonant frequency of at least one target class of carbon nanotubes, the resonant frequency determined by diameter and chirality of the target class of carbon nanotubes, the mixture including at  
10 least one target class of carbon nanotube;

trapping at least one target carbon nanotube; and

moving the target carbon nanotube into a second microfluidic layer in laminar flow.

15 2. The method of claim 1, further comprising identifying the resonant frequency of the target class of carbon nanotubes.

3. The method of claim 2, further comprising determining diameter and chirality of the target class of carbon nanotubes.

20 4. The method of claim 3, further comprising determining a relationship between diameter, chirality, and resonant frequency of the target class of carbon nanotubes.

5. The method of claim 1, further comprising collecting at least one target carbon nanotube from the second microfluidic layer in laminar flow.

5 6. The method of claim 1, further comprising un-bundling the mixture of carbon nanotubes.

7. The method of claim 1, wherein the target class of carbon nanotubes are metallic single-walled carbon nanotubes.

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8. The method of claim 1, wherein the target class of carbon nanotubes are semiconductor single-walled carbon nanotubes.

9. The method of claim 1, wherein, the mixture of carbon nanotubes  
15 includes another target class of carbon nanotubes, the method further comprising:

directing a laser beam having another laser frequency at the mixture of carbon nanotubes, the another laser frequency being less than  
20 a next resonant frequency of the next target class of carbon nanotubes, the other resonant frequency determined by diameter and chirality of the other target class of carbon nanotubes;

trapping the other target class of carbon nanotubes; and

moving the other target class of carbon nanotubes into a third microfluidic layer.

10. The method of claim 1, further comprising:

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directing another laser beam having a laser frequency less than the resonant frequency of the target class of carbon nanotubes at the mixture of carbon nanotubes;; and

trapping the target class of carbon nanotubes; and

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moving the target carbon nanotubes into the second microfluidic layer.

11. The method of claim 1, wherein the microfluidic layer is water.

15 12. An apparatus, comprising:

a laser to emit a laser beam having a frequency lower than a resonant frequency corresponding to a target class of carbon nanotubes, the resonant frequency determined by diameter and chirality of the target class of carbon nanotubes;

20 a first microfluidic layer in laminar flow, the first microfluidic layer having a mixture of carbon nanotubes, the mixture of carbon nanotubes having at least one target carbon nanotube; and

a second microfluidic layer in laminar flow, the second microfluidic layer in proximity with the first fluid,

the laser beam optically coupled to induce at least one optical dipole trap in the target carbon nanotube and to move the target carbon nanotube into the second microfluidic layer.

5 13. The apparatus of claim 12, wherein the first and second microfluidic layers comprise water.

14. The apparatus of claim 12, wherein the target class of carbon nanotubes is metallic single-walled carbon nanotubes.

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15. The apparatus of claim 12, wherein the target class of carbon nanotubes is semiconductor single-walled carbon nanotubes.

16. The apparatus of claim 12, further comprising a third microfluidic layer in laminar flow, the third microfluidic layer in proximity with the second microfluidic layer.

17. The apparatus of claim 16, wherein the laser beam is coupled to emit a next frequency lower than a resonant frequency corresponding to a next target class of carbon nanotubes in the mixture of carbon nanotubes, the next resonant frequency determined by diameter and chirality of the next target class of carbon nanotubes, the laser beam being optically coupled to trap the next target class of carbon nanotubes

and to move the next target class of carbon nanotubes into the third microfluidic layer.

18. The apparatus of claim 12, further comprising a first collector to  
5 collect the target class of carbon nanotubes.

19. A system, comprising:

an apparatus coupled to direct a laser beam at a mixture of carbon nanotubes disposed in a microfluidic layer in laminar flow, the  
10 laser beam having a laser frequency less than a resonant frequency of at least one target class of carbon nanotubes, the resonant frequency determined by diameter and chirality of the target class of carbon nanotubes, the mixture including at least one target class of carbon nanotube, the laser beam to move the target carbon nanotube into a  
15 second microfluidic layer in laminar flow, the apparatus to collect the target carbon nanotube from the microfluidic layer in laminar flow; and  
a piezoelectric tube coupled to the collected target carbon nanotube.

20. The system of claim 19, further comprising a current amplifier  
20 coupled to the collected target carbon nanotube.

21. The system of claim 20, further comprising a display coupled to the current amplifier.

22. An article of manufacture, comprising:

a machine-accessible medium including data that, when  
accessed by a machine, cause the machine to perform the operations  
5 comprising:

directing a laser beam at a mixture of carbon  
nanotubes disposed in a microfluidic layer in laminar flow, the laser beam  
having a frequency less than a resonant frequency of at least one target  
class of carbon nanotubes, the resonant frequency determined by  
10 diameter and chirality of the target class of carbon nanotubes, the  
mixture including at least one target class of carbon nanotube;

trapping at least one target carbon nanotube; and  
moving the target carbon nanotube into a second  
microfluidic layer in laminar flow.

23. The article of manufacture of claim 22, wherein the machine-  
accessible medium further includes data that cause the machine to  
perform operations comprising identifying the resonant frequency of the  
target class of carbon nanotubes.

24. The article of manufacture of claim 23, wherein the machine-  
accessible medium further includes data that cause the machine to  
perform operations comprising identifying the diameter and chirality

corresponding to the resonant frequency of the target class of carbon nanotubes.

25. The article of manufacture of claim 24, wherein the machine-  
5 accessible medium further includes data that cause the machine to perform operations comprising determining a relationship between diameter, chirality, and resonant frequency of the target class of carbon nanotubes.

10 26. The article of manufacture of claim 22, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising collecting the target carbon nanotube from the second microfluidic layer in laminar flow.

15 27. The article of manufacture of claim 22, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising un-bundling the mixture of carbon nanotubes.